

Official Amendment
Serial No. – 10/038,150
Docket No. – UVD 0299 PA / 40815.347

REMARKS

Claims 1-119 were pending in the present application. Claims 1, 7, and 12 have been amended, claims 2 and 54-119 were canceled, and new claims 123-125 were added. As a result of this amendment, claims 1, 3-53, and 123-125 are pending. Reexamination and reconsideration are requested in light of the accompanying amendments and remarks.

Applicants discovered on May 16, 2005 in preparing this response that the substitute specification filed on February 28, 2002 in response to the Notice to File Corrected Application Papers was not a duplicate of the original specification as filed on January 4, 2002, but an earlier draft version. Due to the length of the specification, it was impossible to file a corrected specification with this response identifying the differences between it and the previous (incorrect) version. However, a corrected specification will be filed as soon as possible. Because the original application included 122 claims, the new claims added in this amendment have been numbered beginning with 123.

Claims 54-119 have been canceled without prejudice pending their resubmission in a timely filed divisional application pursuant to the restriction requirement.

Applicants have updated the cross-reference information by amending the paragraph beginning on page 1, line 5.

The objection to claim 7 as being of improper dependent form for failing to further limit the subject matter of a previous claim has been overcome. Claim 7 has been amended to recite the inorganic valence stabilizer, and new claim 123 recites the organic valence stabilizer.

The provisional rejection of claims 1-53 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 3-48 of copending Application Serial No. 10/038,274 has been overcome.

The composition of as-formed conversion coatings as defined in the '274 application and the coating formed via rinses or seals as in this application are substantially different. Conversion coatings (the '274 application) are formed on metals that have no prior coating

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associated with them; in fact, the metal to be coated must be substantially free of any pre-existing coating. For rinses and seals, however, a pre-existing coating is inherently part of the overall coating system formed on the metal. For example, phosphate coatings on steel are rinsed with chromates on automobile bodies. The phosphate coating already exists on the metal article. A subsequent treatment process (rinse or seal) is then applied to the pre-existing coating. The pre-existing coating is retained on the metal. Only minor pinholes or voids in this preexisting coating are filled with compound from the rinse and seal operation.

Compositional differences on the metal article after treatment are substantial. If the metal is conversion coated (the '274 application), the coating is 100% cobalt-valence stabilizer complex (as described in the '274 application). If the article is rinsed or sealed, the overall coating is typically at least 75 weight percent pre-existing coating, often 95 weight percent or more pre-existing coating. Therefore, a significant difference in the amount of cobalt can be expected between the two treatment processes.

Table 1 in the application defines those pre-existing coatings that are rinsed and sealed. Most often, the preexisting coating is an oxide or a phosphate. Therefore, for coatings that are rinsed or sealed, the majority of the overall coating is oxide or phosphate.

The claimed coating of the '274 application is not substantially identical to the claimed seal of the present application. Therefore, the claims in the present application are patentably distinct from the claims in the '274 application.

Applicant notes that claims 11 and 32 were rejected only for double patenting. Claim 11 has been rewritten in independent form as claim 124, and claim 32 has been rewritten in independent form as claim 125. These claims are believed to be allowable in view of the discussion above.

The rejection of claims 1-10, 12-31, 33, and 35-43 under 35 U.S.C. § 102(b) as being anticipated by Schapira (U.S. Patent No. 6,068,709) has been overcome. Schapira teaches a process for the phosphatization of metallic substrate comprising the use of a phosphatization bath having a pH from about 1 to 5.5 and which comprises from about 0.3 to about 25 g/l of zinc ion,

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from about 5 to about 50 g/l phosphate ion, and from about 0.01 to about 10 g/l of a trivalent cobalt complex represented by 1 of 2 formulas. Col. 2, lines 28-62.

In Schapira, the trivalent cobalt complex in aqueous solution is an accelerator for the phosphating process. As discussed in "Phosphate Coatings," ASM Handbook, Vol. 5, p. 379, 1994, and "Chemical Conversion and Anodized Coatings," R. Burns et al., Protective Coatings for Metals, p. 547, 1955 (copies attached), accelerators for phosphating solutions are oxidizers, typically nitrates, nitrites, chlorates, nitroguanidine, hydrogen peroxide, etc., dissolved in the phosphating bath that increase the reaction rate with the metal substrate by eliminating hydrogen formation.

Schapira does not teach or suggest the use of trivalent or tetravalent cobalt in the formed coating. Claim 1 recites that the trivalent or tetravalent cobalt/valence stabilizer complex is present in the seal itself in order to provide adequate corrosion protection. Claim 1 also recites the solubility of the cobalt/valence stabilizer complex. The dependent claims further describe the physicochemical characteristics that the oxidized trivalent or tetravalent cobalt exhibits in the seal in order to provide adequate corrosion protection.

The general concept of valence stabilization of cobalt in solution was known. However, a trivalent or tetravalent cobalt/valence stabilizer complex incorporated in a solid film for corrosion inhibition is novel.

The ability to stabilize trivalent cobalt in solution as described in Schapira does not guarantee an effective cobalt seal. In the majority of cases, adding stabilizers to the bath is detrimental to the coating formed because of solubility differences. The cobalt complexes described in Schapira have high aqueous solubilities. For example, Material Safety Data Sheets for $[\text{Co}(\text{NO}_2)_6]\text{Na}_3$ (Aldrich Catalog No, 46,373-6) and $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ (Aldrich Catalog No, 48,152-1) describe both as "very soluble in water." Although a compound that is "very soluble in water" may be an excellent choice as an accelerator for phosphating solutions, it would be a poor choice for a constituent compound in a seal because it would be washed away quickly by corrosive media.

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The high aqueous solubility of the compounds in Schapira is evidenced in the steps required to form the compounds and separate them from solution. For example, processes involving $[\text{Co}(\text{NO}_2)_6]\text{Na}_3$ are described in Chemical Abstracts Vol. 26, 3200, Chemical Abstracts 1628, and Chemical Abstracts Vol. 45, 4167 (copies of which are enclosed). $[\text{Co}(\text{NO}_2)_6]\text{Na}_3$ is used as a water-soluble precipitating agent for potassium. The sodium salt of $\text{Co}(\text{NO}_2)_6$ exhibits high water solubility, whereas the potassium salt is very insoluble in water. Schapira does not describe the use of the potassium salt because of its low solubility, which would make it unavailable in solution as a phosphating accelerator. The formation of $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ from aqueous solution requires "salting out" with the addition of 400 ml of concentrated HCl to 1500 ml water with 230 g of $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ contained therein. Inorganic Syntheses, Vol. 2, pp. 217-218. Preparation of $[\text{Co}(\text{NO}_3)(\text{NH}_3)_5](\text{NO}_3)_2$ from the equally high solubility $[\text{Co}(\text{NH}_3)_5\text{CO}_3]\text{NO}_3$ and nitric acid is detailed in Inorganic Syntheses, Vol. 4, p. 174, 1953 (copy attached). 100 ml of methanol must be added to the 25 ml of water (a standard "salting-out" procedure), followed by heating for 18 hours at 100°C to drive water off in order to produce 10 g of the desired compound. Similarly, the synthesis of $[\text{Co}(\text{NH}_3)_5\text{CO}_3]\text{NO}_3$ requires extensive evaporation to begin to obtain the product (1.6 l to 500 ml), Inorganic Syntheses, Vol. 6, p. 173-174 (copy attached), demonstrating that even the use of carbonate as a trivalent cobalt valence stabilizer in solution does not ensure that a sparingly soluble trivalent cobalt compound will result. Synthesis of $[\text{Co}(\text{oxalate})\text{en}_2]\text{Cl}$, which is analogous to Schapira's $[\text{Co}(\text{oxalate})\text{en}_2]\text{NO}_3$ also requires extensive evaporation to acquire a product. (Mori, et al. Bull. Chem. Soc. Japan 31:291-5, 1958; CA 52: 18060) (copy attached).

These examples show that there is a significant difference between stabilization in solution, where maximum solubility is desirable, and stabilization in a formed coating, where sparingly soluble characteristics are desired. Schapira is concerned with the presence of trivalent cobalt as an accelerator for phosphating baths. Because of this requirement, high solubility in the water bath is necessary. If the solubility of a compound in water is too low, then the compound will be unavailable in the bath to act as an accelerator. Conversely, the present invention involves the

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presence of a sparingly soluble compound in the formed coating. Nowhere in Schapira are the solubility requirements for the trivalent compounds discussed. Schapira's trivalent compounds are unusable as coating constituents in the present invention because of their high solubility, a necessary requirement to act as an accelerator for the phosphating bath.

According to the examiner, the “specific properties recited in the dependent claims, including solubility, the electrostatic barrier, the ion exchange property, and the cavity containing cobalt and an additional ion are inherent properties necessarily present from the presence of the same claimed chemicals, namely the trivalent cobalt complex that has been combined with a ligand (a valence stabilizer).” However, as explained above, the presence of a stabilized cobalt compound in solution as in Schapira is not the same as a cobalt/valence stabilizer complex within the solid corrosion-inhibiting seal. Moreover, Schapira's cobalt compounds do not have the claimed solubility, as discussed. The dependent claims further describe the physicochemical characteristics that the oxidized trivalent or tetravalent cobalt exhibits in the coating in order to provide adequate corrosion protection, characteristics which are not inherent in Schapira's cobalt stabilized in solution.

With respect to claim 10, the cobalt compounds of Schapira do not inherently have a central cavity containing a cobalt ion and an additional ion. Nowhere in Schapira is there any type of cobalt compound which has a central cavity containing a cobalt ion and an additional ion. See p. 150, line 22 to p. 151, line 10. The examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. MPEP 2112. All organic compounds and simple inorganic compounds bond directly to the cobalt ion, whether in solution or in the coating. The valence stabilizers with a central cavity are the larger inorganic valence stabilizers that can polymerize, i.e., the heteropolymetallates, such as molybdate, tungstate, vanadate, etc. See p. 24, line 28 to p. 26, line 12, and p. 150, line 22 to p. 151, line 10. None of Schapira's compounds have a central cavity having another metal ion in it. The central cavity only contains the trivalent cobalt ion.

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The seals of the present invention could be used over a phosphate coating formed from a bath such as is described in Schapira.

Thus, claims 1-10, 12-31, 33, and 35-43 are not anticipated by Schapira.

The rejection of claims 1-10, 12-31, 33, and 35-43 under 35 U.S.C. § 102(b) as being anticipated by the admitted prior art in the disclosure has been overcome. According to the examiner, "[t]he admitted prior art of the instant disclosure, at pages 9 and 10 for example, teaches compositions for seals which meet the requirements of the instant claims, including both a trivalent cobalt compound and a valence stabilizer compound. See particularly, applicant's citation of Japanese patents 77 06,258, 76 42,057, 74 34,929, and 74 14621 for example."

However, contrary to the examiner's position, these references do not anticipate the claimed invention. Claim 1 recites that trivalent or tetravalent cobalt is present in the seal itself in order to provide adequate corrosion protection. It also recites the solubility of the cobalt/valence stabilizer complex. The dependent claims further describe the physicochemical characteristics that the oxidized trivalent or tetravalent cobalt exhibits in the seal in order to provide adequate corrosion protection.

JP 77 06,258, 76 42,057, and 74 34,929 do not teach the use of trivalent or tetravalent cobalt, or a cobalt/valence stabilizer complex, or the solubility of the cobalt/valence stabilizer complex, as claimed. JP 74 14,621 does not teach the use of trivalent or tetravalent cobalt, or the solubility of the cobalt/valence stabilizer complex, as claimed. The comments in the specification concerning JP 77 06,258, 76 42,057, 74 34,929, and 74 34,929 are purely speculative (e.g., possible, if, could possibly), and were not present in the specification as originally filed for that reason.

Therefore, claims 1-10, 12-31, 33, and 35-43 are not anticipated by the Japanese references.

The rejection of claims 44-53 under 35 U.S.C. §103(a) as being unpatentable over Schapira in view of Ouyang (U.S. Patent No. 5,505,792) has been overcome. Ouyang is cited as teaching coloring and coloring additive for conversion coatings. However, Ouyang does not

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remedy the deficiencies of Schapira. Therefore, claims 44-53 would not have been obvious to one of ordinary skill in the art at the time the invention was made.

CONCLUSION

Applicants respectfully submit that, in view of the above amendment and remarks, the application is now in condition for allowance. Applicants respectfully request that claims 1, 3-53, and 123-125 be passed to allowance.

If the Examiner has any questions or comments regarding the present application, he is invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,
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